

## Clinical practices in the hospital care of healthy newborn infant in Brazil

Práticas de atenção hospitalar ao recém-nascido saudável no Brasil

La práctica en el cuidado recién nacidos sanos en Brasil

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### Abstract

*The aim of this study was to evaluate the care of healthy full-term newborns and to identify variations in childbirth care and practices in the first hour of life. We used data from the Birth in Brazil survey. Unadjusted and adjusted odds ratio (OR) of hospital-delivered care for the mother and during childbirth were estimated for the following outcomes: upper airways and gastric aspiration, use of inhaled oxygen, use of incubator, skin-to-skin contact after birth, rooming-in and breastfeeding in the delivery room and within the first hour of life. We observed wide variations in the care of healthy full-term newborn in the delivery room. Practices considered inadequate, such as use of inhaled oxygen, (9.5%) aspiration of airways (71.1%) and gastric suctioning (39.7%), and the use of incubator (8.8%) were excessively used. Breastfeeding in the delivery room was low (16%), even when the Baby-Friendly Hospital Initiative had been implemented (24%). The results suggest poor knowledge and compliance by health practitioners to good clinical practice. Such noncompliance was probably not due to the differences in resources, since most births take place in hospitals where the necessary resources are available.*

*Newborn Infant; Medical Assistance; Child Care*

### Resumo

*O objetivo do estudo foi avaliar o cuidado ao recém-nascido saudável a termo e identificar variações nesse cuidado no atendimento ao parto e na primeira hora de vida. Utilizou-se a base de dados da pesquisa Nascer no Brasil. Foram estimadas as razões de produtos cruzados OR brutas e ajustadas entre as características do hospital, maternas e de assistência ao parto com os desfechos: aspiração de vias aéreas e gástrica, uso do oxigênio inalatório, uso de incubadora, contato pele a pele, alojamento conjunto e oferta do seio materno na sala de parto e na primeira hora de vida. Foi observada grande variação das práticas usadas na assistência ao recém-nascido a termo na sala de parto. Práticas consideradas inadequadas como uso de oxigênio inalatório (9,5%), aspiração de vias aéreas (71,1%) e gástrica (39,7%) e uso de incubadora (8,8%) foram excessivamente usadas. A ida ao seio na sala de parto foi considerada baixa (16,1%), mesmo nos hospitais com título de Hospital Amigo da Criança (24%). Esses resultados sugerem baixos níveis de conhecimento e aderência às boas práticas clínicas.*

*Recém-Nascidos; Assistência Médica; Cuidado da Criança*

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## Introduction

Medical care of the full-term, healthy newborn in the delivery room has undergone numerous changes over the past few years, one of the purposes being to decrease the excess of interventions performed on the newborn. There are evidences that most of the performed interventions are unnecessary, and some may even be harmful.<sup>1,2,3</sup>

In addition, it is known that the excess of interventions in the delivery room affects the mother/baby interaction. Such early interaction influences the physiology and behavior of both of them. The mother/baby body contact helps regulate the body temperature of the newborn, the maintenance of the acid-base balance, the adjustments for respiration and crying, and promotes maternal-care behavior<sup>4</sup>. Similarly, the baby may regulate, i.e., increase, the mother's attention for their needs, influence the beginning and maintenance of breastfeeding, and stimulate the release of gastrointestinal hormones, leading to a better use of the calories ingested. The effects of some of these situations may still be seen months later<sup>4,5</sup>.

It has thus been recommended that practices addressing issues other than just survival should be incorporated into the routine care of the newborn<sup>7</sup>. Such practices include late umbilical cord-clamping, immediate skin-to-skin contact between mother and baby, early initiation of breastfeeding, kangaroo care, among others. The use of such practices in birthcare, however, varies greatly among health-care facilities around the world, along with geographic and social inequalities, differences in medical expertise, and demographic characteristics of the patients<sup>8,9,10</sup>. These practices may affect the quality of the care provided, and change immediate and life-long outcomes<sup>11,12</sup>.

Variations in the practices used for the care of healthy newborns have been addressed in different situations, with different impacts on their health. Published data reports huge discrepancies between the existing scientific evidences and the medical practices. Furthermore, practitioners may not respond to evidences by implementing changes in policies and practices. This may be due to lack of knowledge or disagreement with the recommendations, but particularly due to local barriers for implementation.<sup>10,13,14,15,16,17</sup>

The goal of this study was to assess the practices performed, and to identify variations in the delivery of care for the full-term, healthy newborn in the delivery room and in the first hour of life.

## Methodology

*Birth in Brazil* is a national hospital-based study with postpartum women and their newborns, carried out between February 2011 and October 2012<sup>18</sup>. The sample was selected in three stages. The first included hospitals with 500 or more deliveries/year, stratified by the five macro-regions of Brazil, location (capital city or not), and type of hospital (private, public, and mixed). The second included days (at least seven days for each hospital), and the third included postpartum women. In each of the 266 hospitals of the sample, 90 postpartum women were interviewed, a total of 23,940 subjects. Further information of the sample design is presented on Vasconcellos et al.<sup>19</sup>.

In the first stage of the study, face-to-face interviews were held with the postpartum women during their hospital stay, data about the woman and the newborn were collected from their medical chart, and pictures of the pre-natal cards of the woman were taken. Interviews over the phone were held before six months and at twelve months after delivery, to collect information about maternal and newborn outcomes. Detailed information on data collection is reported in do Carmo Leal et al.<sup>18</sup>.

The study included only variations in care of full-term births ( $\geq 37$  weeks of pregnancy), with birth weight  $\geq 2,500$ g, 1-minute Apgar score  $\geq 7$ , and of single pregnancy. Exclusion criteria included HIV-positive mothers, newborns with congenital malformations, (reported by the mother or recorded in the maternal or the newborn chart), and need of positive pressure ventilation in the first minutes of life. With inclusion and exclusion criteria applied, the actual sample was of 18,639 newborns. All analyses considered took into consideration the design of the sample, and the figures presented on the Tables are adjusted by the sample weight<sup>18</sup>.

As the number of newborns eligible for this analysis was smaller than the total of the sample, *post-hoc* sample size calculations were made. Considering a 50% prevalence of newborns who received an intervention during birth and a 5% significance level, the smallest sample used in the article had a 90% power to detect differences of at least 2%.

Two groups of outcome variables of the care provided to the healthy newborn were considered: the first group included improper practices (aspiration of airways and gastric suctioning, use of inhaled oxygen, and use of incubator<sup>1,2,3</sup>), and the second group considered the good medical practices (skin-to-skin contact immediately after birth, offering the breast to the newborn in the delivery room, breastfeeding within the first hour

of life, and rooming-in straight from the delivery room<sup>6,7,10</sup>). Breastfeeding in the first hour of life, in this study, means the mother offering her breast until 59 minutes after delivery.

The independent variables used to assess different medical practices in the care of the healthy newborn included: region of the country (North, Northeast, Central, Southeast or South), location (capital city or not), and Baby-Friendly accreditation (yes or no) as a characteristic of the hospital; maternal age (< 20 years, 20-34, ≥ 35), schooling (incomplete primary education, complete primary education, complete secondary education, complete higher education), skin color as mentioned by the woman (white, black, brown, yellow/indians), and number of previous deliveries (primiparus, 1 to 2 previous deliveries, three and more previous deliveries) as maternal characteristics; presence of a companion during delivery (yes, no), type of delivery (vaginal, c-section), and source of payment for childbirth (public or private) as birthcare characteristics. It was considered of private funding the childbirth that occurred in private-only facilities, paid by private health plans or out-of-pocket, or those that took place in a public or mixed facility and were paid by a health plan. The remainder was classified as public-funded birthcare.

All the selected outcome and independent variables were collected from the information recorded on hospital charts and validated by a questionnaire applied to the women.

Bivariate analyses were performed with the independent and the outcome variables. To identify variations, the proportions and their respective 95% confidence intervals (95%CI) for the interventions and good practices were calculated according to the independent variables. For the multivariate analysis, logistic regression techniques were used. All independent variables were included in the multivariate model. The adjusted odds ratio (OR) (and respective 95%CI) were estimated for all exposure variables. Interactions among the investigated variables were tested.

The study was approved by the Ethics Research Committee of the Oswaldo Cruz Foundation, and by the ethics committees of the participating institutions. All postpartum women who were subjects in this study signed the Informed Consent form.

## Results

There was a high proportion of aspiration of the upper airways, ranging from 62.5% in the Northeast to 76.8% in the Southeast, as well as gastric suctioning, which ranged from 33.8% in

the Northeast to 47.8% in the Central Region. The use of inhaled oxygen (8.8%) and incubator (8.7%) was also high, given the low risk presented by these newborns. The proportion of interventions was higher in hospitals not accredited by the Baby-Friendly, in childbirths paid by the private sector, or performed in women who had higher level of education, were white, primiparous, and in those whom a c-section was performed (Table 1).

The skin-to-skin contact of the mother with the newborn immediately after birth was more frequent in the Southern Region (32.5%), as well as offering the breast in the delivery room (22.4%). However, the proportion of childbirths in which the breast is offered in the delivery room is still low in all regions of Brazil (16.1%), with the lowest proportion found in the Northeastern region (11.5%). In hospitals with Baby-Friendly accreditation, the offering of the breast in the delivery room was significantly higher, but still in a low proportion (24%). Separating the baby from the mother also varied significantly among the regions of Brazil. In the Northern Region, 87.3% of the newborns roomed-in with the mothers, whereas in the Southeastern Region this proportion was of 61.4% only. Newborns from vaginal delivery and in hospitals of the Brazilian Unified National Health System (SUS) had a significantly smaller chance of being placed away from the mother after delivery; the same goes for adolescent, lower educated, Indian, and multiparous women, and in deliveries in hospitals located in capital cities, or accredited with the Baby-Friendly Initiative (Table 2).

In the adjusted analysis, the Northeastern Region was a protective variable for aspiration of the upper airways. Gastric suction, in turn, was less frequent in cities of the countryside. The use of inhaled O<sub>2</sub> was less frequent in the Northern and Northeastern regions, and in newborns from vaginal deliveries. Lower use of incubators was associated to deliveries in the Central Region, vaginal delivery, and public funding of childbirth (Table 3).

After adjustment for confounders, the variables that were more significantly associated to skin-to-skin contact between mother and baby immediately after birth included delivery in a Baby-Friendly accredited hospital, the presence of a companion during delivery, and vaginal delivery. Women whose delivery was in the countryside, of lower education, and whose birthcare was paid by the public sector had less chance of early skin-to-skin contact. The offering of the maternal breast in the delivery room was associated to being born in a Baby-Friendly accredited hospital, the presence of a companion during delivery, and

Table 1

Interventions considered unsuitable performed in healthy newborns according to sociodemographic characteristics: bivariate analysis. Brazil, 2011-2012.

	Upper airways aspiration			Gastric suctioning			Inhaled O2			Use of incubator			Total n *
	n *	%	95%CI	n *	%	95%CI	n *	%	95%CI	n *	%	95%CI	
Region													
North	1,226	72.5	59.8-82.4	595	35.2	24.1-48.0	71	4.2	2.8-6.2	100	5.9	1.9-17.0	1,692
Northeast	3,276	62.5	51.8-71.9	1,775	33.8	25.0-44.0	282	5.4	3.8-7.6	268	5.1	2.4-10.5	5,246
Southeast	6,233	76.8	70.3-82.3	3,529	43.5	36.0-51.3	1,004	12.4	9.3-16.3	796	9.8	6.7-14.2	8,112
South	1,729	72.1	61.5-80.7	890	37.1	26.5-49.0	174	7.3	5.2-10.1	423	17.6	8.8-32.3	2,399
Central	770	64.7	49.7-77.3	568	47.8	32.1-63.8	108	9.1	5.8-14.1	32	2.7	1.7-4.3	1,190
Location													
Capital city	4,786	71.4	63-78.4	3,157	47.1	38.1-56.2	544	8.1	5.8-11.2	467	7.0	4.6-10.4	6,707
Non-capital city	8,448	70.8	65.4-75.7	4,200	35.2	29.9-40.9	1,096	9.2	7.3-11.4	1,152	9.7	6.6-13.9	11,932
Baby-Friendly Initiative accreditation													
No	7,961	70.2	64.4-75.5	4,280	37.8	31.8-44.0	1,083	9.6	7.4-12.3	1,198	10.6	7.2-15.2	11,335
Yes	5,273	72.2	64.6-78.7	3,077	42.1	35.1-49.5	556	7.6	5.9-9.8	421	5.8	3.8-8.6	7,304
Maternal age (years)													
10-19	2,388	69.0	63.9-73.7	1,285	37.1	31.8-42.8	265	7.7	6.2-9.4	220	6.4	4.7-8.5	3,460
20-34	9,506	71.4	66.8-75.6	5,374	40.4	35.6-45.3	1,209	9.1	7.5-11	1,191	9.0	6.6-12.0	13,312
≥ 35	1,339	71.7	66.1-76.8	698	37.4	32.1-43.1	166	8.9	6.7-11.7	207	11.1	7.4-16.4	1,866
Maternal education (years in school)													
≤ 7	3,282	68.7	63.3-73.6	1,836	38.4	32.7-44.6	326	6.8	5.4-8.5	325	6.8	4.9-9.4	4,778
8-10	3,353	70.5	65.4-75.1	1,870	39.3	34.1-44.7	399	8.4	6.6-10.6	356	7.5	5.4-10.3	4,757
11-14	5,301	72.5	67.6-76.9	2,962	40.5	35.2-46.0	738	10.1	8.2-12.3	693	9.5	6.8-13	7,311
≥ 15	1,247	72.9	64.5-79.9	667	39.0	31.7-46.7	171	10.0	7.7-13.0	241	14.1	8.7-22.2	1,711
Skin color reported by the mother													
White	4,704	73.4	68.5-77.8	2,519	39.3	34.0-44.8	614	9.6	7.7-11.8	768	12.0	8.5-16.7	6,412
Black	1,089	69.2	62.1-75.2	618	39.2	32.4-46.4	137	8.7	6.6-11.4	120	7.6	5.3-10.8	1,574
Brown	7,219	69.7	64.6-74.3	4,101	39.6	34.5-44.9	853	8.2	6.7-10.0	711	6.9	5.0-9.3	10,362
Yellow	160	76.8	67.3-84.2	93	44.5	34.4-55.0	29	14.1	7.5-25.1	18	8.7	3.8-18.4	208
Indian	60	73.8	54.9-86.7	26	31.9	20.9-45.3	5	5.8	2.1-14.6	2	2.2	0.5-8.9	81
Number of previous deliveries													
0	6,141	71.4	66.6-75.7	3,379	39.3	34.4-44.3	798	9.3	7.6-11.3	807	9.4	6.9-12.6	8,601
1-2	5,832	71.3	66.7-75.4	3,267	39.9	35.1-44.9	707	8.6	7.0-10.6	696	8.5	6.2-11.6	8,186
≥ 3	1,261	68.1	61.9-73.7	711	38.4	32.0-45.1	134	7.3	5.6-9.3	116	6.3	4.5-8.7	1,852
Companion in the delivery room													
No	8,659	70.7	65.5-75.4	4,775	39.0	33.6-44.6	978	8.0	6.6-9.7	996	8.1	5.8-11.3	12,244
Yes	4,571	71.5	65.8-76.6	2,581	40.4	34.6-46.4	660	10.3	7.9-13.4	622	9.7	6.6-14.1	6,390
Type of birth													
Vaginal	6,324	69.6	64.6-74.2	3,522	38.8	33.2-44.6	580	6.4	5.0-8.1	495	5.5	4.0-7.4	9,082
Cesarean-section	6,911	72.3	67-77	3,835	40.1	35.2-45.3	1,060	11.1	9.1-13.4	1,124	11.8	8.5-16.1	9,557
Source of childbirth payment													
Public	10,479	71.1	66.2-75.6	5,826	39.6	34.2-45.1	1,205	8.2	6.5-10.2	976	6.6	4.8-9.1	14,731
Private	2,756	70.5	60.7-78.8	1,530	39.2	31.9-46.9	435	11.1	8.9-13.8	643	16.5	10.2-25.5	3,908
Brazil	13,234	71.0	66.5-75.1	7,357	39.5	34.8-44.4	1,640	8.8	7.3-10.6	1,619	8.7	6.5-11.6	18,639

95%CI: 95% confidence interval.

\* Figures corrected by the sample weight.

Table 2

Good practices performed in healthy newborns according to sociodemographic characteristics: bivariate analysis. Brazil, 2011-2012.

	Skin-to-skin contact immediately after birth			Offering of maternal breast in the delivery room			Rooming-in			Breastfeeding in the 1st hour of life			Total
	n *	%	95%CI	n *	%	95%CI	n *	%	95%CI	n *	%	95%CI	n *
Region													
North	469	27.9	20.6-36.5	212	12.5	6.7-22.2	1,477	87.3	80.7-92.1	980	57.9	52.7-63.2	1,692
Northeast	1,510	28.8	24-34.2	603	11.5	8.1-16.1	3,744	71.4	64.8-77.5	2,167	41.3	37.6-45.3	5,246
Southeast	2,175	26.9	22.6-31.6	1,463	18.1	13.1-24.5	4,977	61.4	53.3-69.0	3,393	41.8	36.5-47.6	8,112
South	780	32.5	26.5-39.2	538	22.5	15.6-31.3	1,801	75.1	61.4-85.1	1,161	48.4	40.2-56.8	2,399
Central	302	25.5	17.9-34.9	187	15.8	9.9-24.2	854	71.8	58.0-82.4	599	50.4	44.0-57.0	1,190
Location													
Capital city	2,343	35.0	29.6-40.8	1,350	20.1	14.6-27.1	5,053	75.4	68.4-81.3	3,009	44.9	40.6-49.4	6,698
Non-capital city	2,893	24.3	21.6-27.2	1,653	13.9	11.2-17.2	7,800	65.5	60.0-70.6	5,291	44.5	40.7-48.3	11,908
Baby-Friendly Initiative accreditation													
No	2,456	21.7	19.0-24.7	1,253	11.1	7.5-16.1	6,590	58.1	51.6-64.6	4,208	37.1	33.2-41.4	11,335
Yes	2,780	38.1	33.6-42.9	1,751	24.0	20.0-28.6	6,263	85.8	82.0-89.1	4,092	56.0	52.7-59.7	7,304
Maternal age (years)													
10-19	985	28.5	25.1-32.2	558	16.1	12.7-20.3	2,573	74.4	70.2-78.5	1,770	51.2	47.7-54.9	3,460
20-34	3,745	28.2	25.4-31.1	2,176	16.4	13.4-19.8	9,108	68.4	64.0-72.7	5,879	44.2	41.1-47.4	13,312
≥ 35	506	27.2	23.8-30.9	270	14.5	12.1-17.4	1,171	62.8	57.2-68.3	651	34.9	31.6-38.6	1,866
Maternal education (years in school)													
≤ 7	1,489	31.2	27.6-35.1	778	16.3	13.5-19.5	3,541	74.1	70.0-78.2	2,446	51.2	48.2-54.4	4,778
8-10	1,332	28.0	24.8-31.5	801	16.8	13.3-21.1	3,444	72.4	67.8-76.6	2,304	48.4	45.1-51.9	4,757
11-14	1,902	26.1	23.5-28.8	1,186	16.3	12.9-20.3	4,882	66.8	61.5-71.9	3,022	41.3	37.9-45.2	7,311
≥ 15	491	28.7	23.2-35.1	228	13.3	9.6-18.2	938	54.8	46.3-63.2	496	29.0	24.6-33.9	1,711
Skin color reported by the mother													
White	1,781	27.8	24.9-31.0	1,121	17.5	14.0-21.7	4,146	64.7	59.1-70.1	2,619	40.8	36.9-45.1	6,412
Black	418	26.5	21.7-31.9	285	18.1	12.9-24.9	1,120	71.1	65-76.7	787	50.0	45.3-55.0	1,574
Brown	2,934	28.4	25.2-31.8	1,532	14.8	12.2-17.9	7,366	71.1	66.9-75.1	4,738	45.7	42.9-48.7	10,362
Yellow	61	29.3	22.4-37.3	36	17.3	11.0-26.1	156	75.0	66.9-81.7	100	48.0	37.4-58.8	208
Indian	40	50.0	34.3-65.6	28	34.8	17.0-58.3	64	78.7	60.1-90.0	55	67.4	50.4-80.8	81
Number of previous deliveries													
0	2,328	27.1	24.2-30.3	1,289	15.0	12.0-18.6	5,803	67.5	62.7-72.1	3,594	41.8	38.6-45.2	8,601
1-2	2,352	28.8	26.1-31.7	1,380	16.9	13.9-20.4	5,660	69.1	64.9-73.3	3,739	45.7	42.7-49.0	8,186
≥ 3	555	30.1	25.6-34.9	334	18.0	14.7-21.9	1,390	75.1	70.7-79.2	966	52.2	48.3-56.0	1,852
Companion in the delivery room													
Não	2,867	23.5	21.0-26.1	1,453	11.9	9.7-14.4	8,310	67.9	63.5-72.2	5,354	43.7	40.6-47.1	12,244
Yes	2,366	37.1	32.3-42.1	1,549	24.3	20.1-29.0	4,538	71.0	64.5-76.9	2,944	46.1	42.1-50.3	6,390
Type of birth													
Vaginal	3,799	41.9	37.9-45.9	2,066	22.8	18.3-28.0	7,124	78.4	73.8-82.6	5,376	59.2	55.8-62.7	9,082
Cesarean-section	1,436	15.1	13.0-17.5	937	9.8	7.9-12.1	5,729	60.0	55.1-64.9	2,923	30.6	27.7-33.8	9,557
Source of childbirth payment													
Public	4,271	29.1	26.0-32.3	2,530	17.2	14.1-20.8	10,848	73.6	69.4-77.7	7,313	49.6	46.5-52.9	14,731
Private	965	24.8	20.7-29.3	473	12.1	8.8-16.6	2,005	51.3	42.1-60.6	987	25.3	20.8-30.5	3,908
Brazil	5,235	28.2	25.5-31.0	3,003	16.1	13.3-19.4	12,853	69.0	64.7-73.1	8,300	44.5	41.7-47.6	18,639

95%CI: 95% confidence interval.

\* Figures corrected by the sample weight.

Table 3

Multivariate logistic regression for interventions performed in healthy newborns. Brazil, 2011-2012.

Predictive variables	Aspiration of upper airways OR (95%CI)	Gastric suctioning OR (95%CI)	Inhaled O2 OR (95%CI)	Use of incubator OR (95%CI)
Characteristics of the hospital				
Region				
North	0.77 (0.38-1.54)	0.61 (0.31-1.19)	0.33 (0.20-0.57) *	0.73 (0.22-2.38)
Northeast	0.47 (0.27-0.83) *	0.6 (0.35-1.03)	0.44 (0.27-0.67) *	0.53 (0.21-1.33)
Southeast	1.00	1.00	1.00	1.00
South	0.72 (0.40-1.30)	0.77 (0.42-1.41)	0.56 (0.35-0.91)	2.04 (0.77-5.39)
Central	0.50 (0.24-1.02)	0.96 (0.44-2.07)	0.71 (0.40-1.28)	0.27 (0.14-0.50)*
Location				
Capital city	1.00	1.00	1.00	1.00
Non-capital city	0.96 (0.61-1.52)	0.61 (0.38-0.98) *	1.08 (0.68-1.71)	1.14 (0.62-2.1)
Baby-Friendly Initiative accreditation				
No	1.00	1.00	1.00	1.00
Yes	0.79 (0.52-1.21)	0.86 (0.56-1.32)	1.00 (0.64-1.55)	1.41 (0.72-2.74)
Characteristics of the woman				
Maternal age (years)				
10-19	0.91 (0.8-1.04)	0.9 (0.79-1.02)	1.00 (0.83-1.22)	0.87 (0.71-1.06)
20-34	1.00	1.00	1.00	1.00
≥ 35	1.06 (0.89-1.25)	0.87 (0.76-1.01)	0.93 (0.74-1.16)	1.05 (0.83-1.34)
Maternal education (years in school)				
≤ 7	0.82 (0.59-1.14)	1.03 (0.78-1.37)	0.97 (0.65-1.43)	1.18 (0.74-1.89)
8-10	0.80 (0.58-1.11)	0.97 (0.74-1.27)	1.05 (0.73-1.51)	1.08 (0.78-1.49)
11-14	0.87 (0.64-1.17)	1.00 (0.78-1.27)	1.12 (0.84-1.48)	0.99 (0.72-1.36)
≥ 15	1.00			
Skin color reported by the mother				
White	1.00	1.00	1.00	1.00
Black	0.86 (0.68-1.09)	0.97 (0.77-1.23)	1.08 (0.83-1.41)	1.00 (0.71-1.42)
Brown	0.93 (0.78-1.10)	1.06 (0.91-1.22)	1.07 (0.90-1.28)	0.88 (0.68-1.14)
Yellow	1.26 (0.81-1.95)	1.22 (0.82-1.82)	1.76 (0.92-3.35)	1.04 (0.49-2.22)
Indian	1.23 (0.50-3.00)	0.75 (0.42-1.32)	0.91 (0.30-2.73)	0.34 (0.08-1.57)
Number of previous deliveries				
0	1.04 (0.94-1.15)	0.99 (0.89-1.10)	1.03 (0.90-1.19)	1.12 (0.98-1.29)
1-2	1.00	1.00	1.00	1.00
≥ 3	0.87 (0.71-1.07)	0.96 (0.79-1.17)	1.02 (0.79-1.33)	0.90 (0.68-1.19)
Birthcare characteristics				
Companion in the delivery room				
No	1.00	1.00	1.00	1.00
Yes	0.87 (0.65-1.17)	0.89 (0.67-1.18)	1.14 (0.83-1.56)	0.78 (0.55-1.12)
Type of birth				
Vaginal	0.86 (0.72-1.02)	0.91 (0.75-1.10)	0.53 (0.44-0.65) *	0.58 (0.47-0.72) *
Cesarean section	1.00	1.00	1.00	1.00
Source of childbirth payment				
Public	1.14 (0.67-1.96)	1.03 (0.68-1.53)	1.03 (0.66-1.58)	0.48 (0.26-0.88) *
Private	1.00	1.00	1.00	1.00

95%CI: 95% confidence interval; OR: odds ratio.

\* p-value &lt; 0.05.

vaginal delivery. Women in the Northeastern Region were the ones who less offered their breast to the newborns in the delivery room. In terms of rooming-in, it was more frequent in the Northern Region of the country. In addition, being born in a hospital where the Baby-Friendly Initiative was already implemented, the presence of a companion during delivery, vaginal delivery, and public funding of childbirth were also associated to this outcome (Table 4). The variables associated to higher chance of breastfeeding within the first hour of life of the baby were being born in the Northern or Central region, in Baby-Friendly accredited hospitals, the presence of a companion during delivery, vaginal delivery, and childbirth funded by the public health system. On the other hand, the proportion of breastfeeding in the first hour of life was lower among women age 35 or more, or primiparous (Table 4).

Interactions among the variables were tested, and the only interaction found in outcomes was Baby-Friendly accreditation in childbirth paid by the private sector for the variables breastfeeding in the first hour of life, and early skin-to-skin contact.

## Discussion

There was high variation among the practices performed in the care of healthy newborns, in the delivery room, in Brazil. Practices considered unsuitable were still broadly performed, whereas some of the considered good practices were left aside. Variations in medical practices have been described since 1938, when Glover<sup>20</sup> reported differences in tonsillectomy rates in different geographic areas of the United Kingdom. Studies initiated by Wennberg & Gittelsohn in the 1970s observed the presence of variations in medical practices for different surgical procedures, and, even after adjustments for age, income, prevalence of diseases, and demographic characteristics of patients, such variations persisted for a number of practices and therapies<sup>15,16,17</sup>. In neonatal care, the presence of variations in delivery is seen in the more common practices<sup>21,22,23,24</sup>, in addition to those analyzed in this study.

Since 2010, the use of oxygen in healthy newborns, in the delivery room, is being considered unsuitable, and yet this is still done. The same goes for aspiration of upper airways and gastric suction. The medical protocols based on the best available evidences recommend that healthy newborns should be assisted close to their mothers, and do not require being submitted to such procedures<sup>1</sup>. Notwithstanding, in this study, there was a high proportion of these practices

(use of oxygen, upper airways and gastric aspiration) performed in a group of newborns that did not need them. Such high proportions of unwarranted procedures occur in all regions of the country, regardless of the source of payment. In the adjusted analysis, delivery in the Northeastern Region is a protective factor for upper airways aspiration; delivery in a non-capital city protects from gastric suctioning; and being in the Northern and Northeastern regions, and having a vaginal delivery are protective factors from the use of inhaled oxygen. The other exposure factors were not significantly associated to these practices, which shows that these are largely disseminated, and that new available evidences are still unknown by most practitioners.

For many years, training of human resources for the provision of care in the delivery room recommended the use of these practices, which still are largely employed in birthcare. To move away from prevailing techniques and technology is difficult, and more so to change behaviors and practices of health practitioners<sup>16,17</sup>. The reasons for non-compliance with good practices were not the subject of this study. However, non-compliance was high, and not related to structural reasons, differently from what is found in most studies on the quality of care<sup>25,26</sup>.

Variations in the medical practices have been attributed to a number of factors, among them the option of the individual practitioner, which is known as “practice style”<sup>27</sup>. Other factors can, however, contribute to these variations, such as characteristics of the patients, socioeconomic aspects, cultural or leadership issues, among others<sup>28,29</sup>. In this study, for instance, vaginal delivery is significantly protects from the use of inhaled oxygen,; the same goes for births in the Northern and Northeastern regions. Thus, the “practice style” alone would not account for the variations. There was also a high proportion of the use of incubator, which implies separating the mother from the baby, particularly in wealthier areas and populations. This reflects a contradiction between access to best practices and social and economic class: the wealthier the population, the more unwarranted practices were performed. The type of delivery also contributed significantly for separating mother from baby, with vaginal delivery showing a protective effect from separation.

Another important aspect considered in offering the newborn the maternal breast in the delivery room, and the mother having contact with the baby in its first hour of life. Once again, the type of delivery was instrumental for this practice. Newborns from vaginal delivery had a higher chance of being breastfed in the deliv-

Table 4

Multivariate logistic regression for good practices performed in healthy newborns. Brazil, 2011-2012.

	Skin-to-skin contact immediately after birth OR (95%CI)	Offering of maternal breast in the delivery room OR (95%CI)	Rooming-in OR (95%CI)	Breastfeeding in the 1st hour of life OR (95%CI)
Characteristics of the hospital				
Region				
North	1.12 (0.69-1.81)	0.66 (0.31-1.40)	4.14 (2.12-8.11) *	1.88 (1.33-2.66) *
Northeast	1.17 (0.83-1.66)	0.61 (0.39-0.96) *	1.49 (0.92-2.40)	0.92 (0.70-1.22)
Southeast	1.00	1.00	1.00	1.00
South	1.23 (0.87-1.74)	1.12 (0.67-1.87)	1.65 (0.82-3.34)	1.20 (0.80-1.80)
Central	0.95 (0.6-1.5)	0.87 (0.40-1.88)	1.39 (0.60-3.23)	1.61 (1.06-2.43) *
Location				
Capital city	1.00	1.00	1.00	1.00
Non-capital city	0.76 (0.58-0.99) *	0.85 (0.50-1.43)	0.85 (0.50-1.44)	1.28 (0.97-1.69)
Baby-Friendly Initiative accreditation				
No	1.00	1.00	1.00	1.00
Yes	1.85 (1.44-2.39) *	2.16 (1.28-3.64) *	3.04 (1.95-4.74) *	1.70 (1.33-2.20) *
Characteristics of the woman				
Age (years)				
10-19	0.81 (0.69-0.96)	1.08 (0.74-1.57)	1.07 (0.94-1.21)	1.08 (0.95-1.25)
20-34	1.00	1.00	1.00	1.00
≥ 35	1.09 (0.92-1.31)	0.93 (0.77-1.13)	0.95 (0.83-1.10)	0.81 (0.71-0.93) *
Maternal education (years in school)				
≤ 7	0.69 (0.52-0.92) *	0.95 (0.77-1.17)	1.06 (0.77-1.46)	1.03 (0.81-1.3)
8-10	0.7 (0.52-0.93)	0.92 (0.63-1.33)	1.08 (0.81-1.43)	0.98 (0.79-1.21)
11-14	0.73 (0.56-0.95)	0.91 (0.64-1.29)	1.13 (0.85-1.51)	1.01 (0.83-1.23)
≥ 15				1.00
Skin color reported by the mother				
White	1.00	1.00	1.00	1.00
Black	0.82 (0.63-1.07)	1.01 (0.72-1.41)	1.02 (0.77-1.36)	1.17 (0.94-1.46)
Brown	0.96 (0.82-1.13)	1.04 (0.79-1.36)	1.02 (0.87-1.20)	0.98 (0.86-1.12)
Yellow	0.95 (0.64-1.41)	0.85 (0.73-1.00)	1.27 (0.82-1.96)	1.11 (0.75-1.63)
Indian	1.59 (0.92-2.75)	2.02 (0.86-4.71)	0.96 (0.34-2.67)	1.76 (0.86-3.61)
Number of previous deliveries				
0	1.03 (0.89-1.18)	0.88 (0.76-1.03)	0.95 (0.84-1.06)	0.88 (0.78-0.98) *
1-2	1.00	1.00	1.00	1.00
≥ 3	0.87 (0.71-1.06)	1.05 (0.85-1.28)	1.02 (0.85-1.22)	1.01 (0.85-1.19)
Birthcare characteristics				
Companion in the delivery room				
No	1.00	1.00	1.00	1.00
Yes	1.72 (1.35-2.23) *	2.11 (1.70-2.62) *	1.61 (1.23-2.13) *	1.41 (1.19-1.65) *
Type of birth				
Vaginal	4.89 (4.02-5.98) *	2.45 (1.80-3.32) *	1.82 (1.43-2.31) *	2.64 (2.25-3.10) *
Cesarean section	1.00	1.00	1.00	1.00
Source of childbirth payment				
Public	0.64 (0.49-0.83) *	1.07 (0.74-1.57)	1.66 (1.11-2.50) *	1.67 (1.27-2.20) *
Private	1.00	1.00	1.00	1.00

95%CI: 95% confidence interval; OR: odds ratio.

\* p-value &lt; 0.05.

ery room; the same goes for newborns whose mothers had a companion present in the delivery room, or in hospitals with Baby-Friendly accreditation. Variations in the breastfeeding-in-the-delivery-room practice ranged from 9.8% to 22.8% for the type of birth, and from 11.9% to 24.3% for the presence of a companion in the delivery room. Maternal age, number of previous children, schooling, and source of payment did not influence such practice. Other authors also found a strong association between type of delivery and offering the maternal breast to the baby in the delivery room<sup>30,31</sup>. However, differently from the study by Boccolini et al.<sup>30</sup>, in this investigation there were no differences for this variable in relation to the source of payment (public or private). There is a 10-year gap between the data collection of our study and Boccolini's<sup>31</sup>. The improvement observed in Brazil regarding this practice is probably due to compliance with the 4<sup>th</sup>-step recommendations of the Baby-Friendly Hospital Initiative<sup>33</sup>.

The 4<sup>th</sup> step of the Baby-Friendly Hospital Initiative implementation is fulfilled when skin-to-skin contact between newborn and mother occurs within thirty minutes from birth, and breastfeeding takes place within one hour after delivery<sup>32</sup>. In this study, even though the skin-to-skin contact reported was around 28% in the whole country, breastfeeding in the delivery room rates were low, ranging from 11.5% to 22.4% among the regions Brazil. The highest breastfeeding-in-the-delivery-room rates are found in the Southern region (22,4%). The Northeast of the country is the area with the highest number of obstetric beds in hospitals of the public health system accredited by the Baby-Friendly Initiative,<sup>32</sup> and was associated to non-breastfeeding in the delivery room. This was an unexpected finding of our study, as birth in a Baby-Friendly accredited hospital was significantly associated to breastfeeding in the delivery room. However, in the Northeast of the country, only 41.3% of healthy newborns were breastfed in their first hour of life; this means that not only newborns were not breastfed in the delivery room, they were deprived from the maternal breast in their first hour of life. These results differ from those of the 2006 *National Survey on Demographics and Health* (PNDS 2006)<sup>33</sup>. Even though the methodology of data collection was different, the PNDS found that 43% of newborns were breastfed in the first hour of life, particularly in the countryside, and in the Northern and Northeastern regions of the country<sup>33</sup>.

The variables that were significantly associated to good practices in the delivery room, after adjustment for confounders, were vaginal delivery, birth in a Baby-Friendly accredited hospital, and presence of a companion in the delivery room. Our study found that vaginal delivery warranted most of the good practices investigated: early skin-to-skin contact, offering of maternal breast in the delivery room, breastfeeding in the first hour of life, and rooming-in with the mother. Birth in a Baby-Friendly accredited hospital also favored good practices in relation to skin-to-skin contact and breastfeeding, in the adjusted analysis. In 2009, the set of recommendations of the Baby-Friendly Initiative was reviewed by the World Health Organization, and some more comprehensive approaches on good practices that targeted the mother were included<sup>34</sup>. Some studies have shown an association between Baby-Friendly accreditation and lower proportion of c-sections<sup>35,36</sup>. Therefore, the type of delivery (vaginal), and birth in a Baby-Friendly accredited hospital should, together, have a protective effect for the newborn being exposed to good practices. Public payment of birth also favors rooming-in and breast offering in the first hour of life, but not for skin-to-skin contact and breast offering in the delivery room.

One of the limitations of this study is that it did not allow the assessment of the reasons for the non-compliance to good practices or for all the variations in medical practices. Another limitation is that, despite the interaction between delivery in a Baby-Friendly accredited hospital and private source of payment, among all hospitals of the sample only one presented these variables with a distinct care model, with goals associated to the use of good practices in childbirth care; in this case, the environment likely fostered the use of good practices.

To conclude, in Brazil, where most deliveries take place in a hospital, there are great variations in the routine care of healthy newborns immediately after birth. The results of this study show that new guidelines for the care of healthy newborns were not incorporated in the medical practice. Non-compliance is not due to differences in the resources, as the deliveries took place in hospitals where the necessary resources were available.

## Resumen

*El objetivo del estudio fue evaluar el cuidado de los recién nacidos sanos y determinar si existen desigualdades en la prestación de servicios y durante la primera hora de vida. Se utilizó la base de datos de la encuesta Nacer en Brasil. Los ratios se estimaron a través del producto odds ratio (OR) y se realizó un ajuste bruto entre las características del hospital, la madre y la atención del nacimiento con los siguientes resultados: aspiración gástrica y de las vías respiratorias, uso de oxígeno inhalado, incubadora, contacto piel con piel, alojamiento conjunto y ofrecer lactancia materna en la sala de partos y en la primera hora de vida. Existe una alta varia-*

*ción de las prácticas utilizadas en el cuidado del recién nacido. Prácticas consideradas inapropiadas, como el uso de oxígeno inhalado (9,5%), aspiración vías respiratorias (71,1%) y gástrica (39,7%) y el uso de incubadora (8,8%) fueron altos. La lactancia materna en la sala de partos fue baja (16,1%), hasta en los hospitales especializados en la atención a niños (24%). Los resultados sugieren bajos niveles de la adhesión a las buenas prácticas.*

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## Contributors

M. E. L. Moreira, S. G. N. Gama, A. A. M. Silva, S. Lansky and M. C. Leal participated in data design, analysis and interpretation, and in the writing and approval of the final version of the article. A. P. E. Pereira and R. S. Pinheiro contributed to data analysis and interpretation, and in the writing of the article and approval of its final version. A. C. Gonçalves contributed to data interpretation, and in the writing and approval of the final version of the article.

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